

to-horizon and the line ship-to-car is 50 to 55 degrees. A greater angle puts undue stress on the aircraft without any appreciable gain in altitude. Release altitude is approximately eight-tenths of the tow-wire length. (An altitude of 2000 feet can be attained in a Schweizer 1-26 with 2500 feet of wire on a two-mile tow run, which includes the wire length. An altitude of 1000 feet can be reached with 1300 feet of wire and a one and a quarter mile run.) Wind conditions will, of course, affect the length of time for the tow.

Before starting tow operations clear all spectators away from the wire. Also be sure people are clear of the wire during the retrieve. If, on the retrieve, a car is about to cross the wire in back of the tow car, stop and let the car cross or the wire will be broken.

A four-man team is best for tow operations: a pilot, a wing-tip runner, a tow-car operator, and an observer in the car. Procedure is as follows:

- (1) Make sure the tow wire is reasonably straight. If there is a bend in the wire the plane will leave the ground before the wire is straight and the slack in the wire will cause the aircraft to mush while only 15 to 50 feet off the ground. Make sure the wire is not snagged under a rock or root as this, too, will pull the ship down.

- (2) With the tow car in position the wing man will check to make sure the ground and air surrounding the area is clear and that the pilot is ready. The wing man will then level the wings. This is the signal for the tow car to gently take up the slack in the tow wire.

- (3) When the wire is taut the ship will start to move and then the wing man will rock the wings through as great an arc as possible. After a couple of such oscillations he will level the wings and the tow car operator will then accelerate as fast as possible until towing speed is reached. Towing speed varies with individual ships and with the wind velocity, but is usually about 50 mph. If one wing is down the tow car should not move—even after taking up slack. If a tow is aborted *release the wire* before unbuckling and getting out of the ship. *Never* have the wire hooked to the plane while it is unoccupied.

- (4) We make a practice of not pulling back very abruptly on the stick until 100 feet of altitude and/or 15 mph above stall speed is reached. When the above conditions are satisfied pull the stick all the way back, but gradually relieve pressure near the end of tow. Of course, if the tow is too slow or too fast (barely above stall speed or a little above auto-tow red line) pull on the stick only very slightly until the speed condition is rectified or, in extremes, release. *When in doubt—release.*

- (5) If the tow is too slow the pilot will rock his wings. This is the signal for the car to speed up. If the tow is too fast the pilot should fishtail to signal the car to slow down. The speeding and slowing of

the car should be done smoothly in about 5-mph increments since the ship is on an arc and changes in car speed will result in a bigger difference in the speed. Keep in mind that the wind velocity often increases above the ground. After making several auto tows the car operator can feel by the pull on the car when his speed is about right.

- (6) When the wire is released by the sailplane the tow-car operator should maintain enough forward speed to keep the chute blossomed out and the wire straight until the chute hits the ground. This operation is important as it keeps loops and snarls out of the wire. After the chute has touched the ground, the wire should be released from the car and the car is then driven back to the chute end of the wire. Disconnect the chute and connect the wire to the car and tow the wire back to the take-off point of the sailplane. During the retrieve a one-foot section of chain is connected to the trailing end of the wire to prevent kinks.

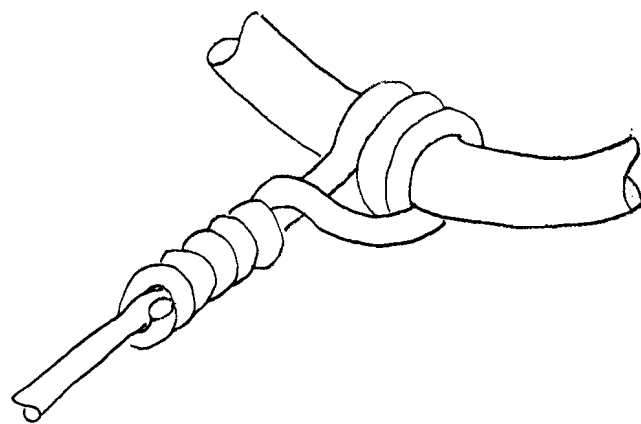
If both the pilot and tow-car operator are experienced, the tow operation can be performed with a pilot and car driver only, as follows:

- (1) Pilot will get in ship and get buckled. Position ship about 20 degrees off tow direction and with the upwind wing tip forward and on the ground.

- (2) The tow-car operator will then hook the wire to the ship and drive down and hook the wire to the car, making sure the wire is straight.

- (3) After checking for air and ground traffic, the tow-car operator will then take up slack. He then can observe the ship begin to move or the rudder to waggle. He then accelerates as before.

- (4) Pilot will allow the ship to pivot on the down wing. After about 40 degrees of pivot kick hard opposite rudder and aileron. When the correction can be felt, neutralize the controls and take off as before. This maneuver has to be done sharply in order to avoid dragging the wing tip on the ground.



Manner in which tow wire is wrapped around tow ring. Three wraps around the ring and five of the wire around itself are recommended.